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- (71) Applicants  
Speywood Laboratories  
Ltd., Chancel House,  
Bingham,  
Nottinghamshire, NG13  
8DR
- (72) Inventors  
David Heath, Peter Lees
- (74) Agents  
J. A. Kemp & Co

## (54) Water miscible gum composition and its preparation and use

(57) Gums useful in therapy for reducing the cholesterol and/or glucose level in the blood i.e. guar gum, locust bean gum, pectin and alkyl celluloses, are made into water-

miscible compositions in which fine particles of the gum are coated with a layer of a substance, e.g. a protein e.g. soya flour, gluten or casein or starch, having a greater tendency to absorb water than the gum. The gum and the coating substance may be mixed with water and the dough formed dried and crushed. The composition gels only slowly when mixed with water.

GB 2 021 948 A

## SPECIFICATION

## Water miscible gum composition and its preparation and use

The present invention relates to water miscible gum compositions. It is known from D.J.A. Jenkins *et al* (The Lancet 1975, 1116 and 1977, 779) that certain edible but unabsorbable gel-forming carbohydrate substances such as guar gum and pectin, when administered to patients in substantial quantities, cause a significant lowering in the levels of cholesterol and glucose in the blood. These substances can therefore be used as medicaments for the control of carbohydrate metabolism and especially for diseases like hyperglycaemia (including hyperglycaemia associated with diabetes), hyperlipoproteinæmia and obesity. However, the desired effects only occur when substantial quantities (e.g. 4 to 6 g 3 to 5 times a day or about 10 to 30 g per day) are taken by the patient, and this presents a major practical problem because the gums are extremely hydrophilic and tend to gel very quickly in contact with water thus making it impossible to administer them in their presently known form to patients either by themselves or in admixture with, for example, foodstuffs or drinks.

If gums in their commercially available form (a finely divided powder) are added to water with inadequate mixing, sticky lumps are formed which then dissolve slowly in water and are difficult or distasteful to consume. Alternatively, if the mixing is adequate, a very viscous gel is very rapidly formed which is unpleasant to drink and can be unacceptable to many patients.

Adding powdered gum to foodstuffs is possible, but is inconvenient and liable to cause an unpleasant gel to be formed; moreover control of the amount consumed is in this case difficult.

The present invention provides a novel gum-containing composition which can be easily mixed with water to give a mixture of moderate viscosity which can easily be drunk.

The water-miscible gum composition of the present invention contains fine particles of a non-absorbable, non-toxic carbohydrate gum which is guar gum, locust bean gum, pectin, or a water-soluble, non-toxic alkyl-cellulose, the said particles having a coating layer comprising a substance having a greater tendency to absorb water than the gum.

Preferably the coating layer contains starch, which may be in the form of wheat, corn, rye and/or maize starch or of flour, and/or a protein, e.g. a vegetable protein such as soya flour or gluten and/or an animal protein such as casein. A protein containing about 12% by weight of starch can advantageously be used.

According to a feature of the invention, the new water-miscible gum composition is made by mixing together the gum and coating substance, pouring the mixture into water with vigorous stirring to form a dough, drying the dough at a temperature between 160 and 280°C., and

65 comminuting the dried dough. The composition is then usually crushed and sieved to obtain particles of the desired size range only, e.g. from 100 to 710 microns. The percentage by weight of the gum in the homogeneous mixture may range from 5% to 90% by weight, preferably 20% to 80% by weight, and more preferably 40% to 60% by weight. The coating substance preferably makes up substantially all the remainder of the homogeneous mixture.

70 Further customary ingredients like flavours, colours, diluents and lubricants can be added to the mixture if desired. Preferably 0.1 to 0.5 parts by weight, and more preferably 0.2 to 0.4 parts by weight, of water are added to each 1 part by weight of the dry mixture.

75 Removal of water from the dough may be achieved by heating, for example by rolling the dough into a thin strip and heating to temperatures between 160 and 280°C; or alternatively it may be dried using other known drying techniques such as fluid bed drying.

80 A specific example of a water miscible gum composition of the invention is described in the following Example in which the gum concerned is guar gum.

85 EXAMPLE

90 A homogeneous mixture is prepared by stirring together 50% by weight of guar gum powder and 50% by weight of corn (maize) starch. It is important that stirring is continued until a homogeneous mixture is obtained as this facilitates formation of a dough.

95 The next step is to add the homogeneous mixture to water in a ratio of 1 part by weight of the dry mixture to 0.3 parts by weight of water to form the dough. This is achieved by vigorously stirring the water to form a vortex. The homogeneous mixture is then poured slowly into the vortex and stirring is continued until a dough is formed. The dough is then dried by heating in an oven at a temperature of 180°C. The dried dough is crushed and finally sieved through a 100μ and 710μ sieve to give a water miscible guar gum composition having fine particles of guar gum coated with starch, the particle size being in the range 100 to 710μ.

100 A guar gum composition made in this way may be easily mixed with water without the problem associated with directly mixing guar gum powder with water, namely the problem of rapid gelling.

105 It is therefore possible, by using the new guar gum composition, not only to introduce higher proportions of guar gum into foodstuffs than heretofore, but also to achieve the addition by simply mixing in the composition during preparation of the foodstuff. Thus it is possible to simply add the composition to foodstuffs such as ice cream, salad creams, soups, bread, and biscuits, etc. to provide a foodstuff having a high concentration of guar gum. Alternatively the composition may simply be dispersed in water and the dispersion drunk before any gelling has taken

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place.

The daily doses of the gum as provided by a 50% composition such as that described above may be, for example, between 12 and 30 g, and more usually 15 to 25 g, which can be administered to the patient in 3 to 5 dosage unit forms of 4 to 6 g, especially 5 g, of pure gum each.

For the purpose of administration the gum composition can be provided in sachets each containing one dosage unit.

#### CLAIMS

1. Water miscible gum composition containing fine particles of a non-absorbable, non-toxic carbohydrate gum which is guar gum, locust bean gum, pectin, or a water-soluble, non-toxic alkyl-cellulose, the said particles having a coating layer comprising a substance having a greater tendency to absorb water than the gum.
2. Composition according to claim 1, wherein the coating layer comprises starch or protein.
3. Composition according to claim 1, wherein the gum is guar gum and the coating substance is wheat starch or corn starch.
4. Composition according to any of claims 1 to 3 containing 5 to 90% by weight of the gum.
5. Composition according to claim 4 containing

20 to 80% by weight of the gum.

6. Composition according to claim 4 containing 40 to 60% by weight of the gum.

7. Process for the production of a composition as claimed in claim 1 which comprises mixing together the gum and the coating substance, pouring the mixture into water with vigorous stirring to form a dough, drying the dough at a temperature between 160 and 280°C, and comminuting the dried dough.

8. Process according to claim 7 in which 1 part by weight of the mixture of gum and coating substance is mixed with 0.1 to 0.5 parts by weight of water to form the dough.

9. Process according to claim 7 or 8, in which the dried dough is crushed and sieved to remove particles smaller than 100 $\mu$  or larger than 710 $\mu$ .

10. A water-miscible gum composition as claimed in any of claims 1 to 6 for use in therapy to lower the cholesterol and/or glucose level in the blood.

11. Process according to claim 7 substantially as hereinbefore described.

12. A water-miscible gum composition as claimed in claim 1 when produced by the process of any of claims 7 to 9 or 11.

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